



## CITY OF LODI COUNCIL COMMUNICATION

AGENDA ITEM

K7a

**AGENDA TITLE:** Receive Report on Mokelumne River Erosion Near Pigs Lake

**MEETING DATE:** November 5, 2008

**PREPARED BY** Interim Parks and Recreation Director

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**RECOMMENDED ACTION:** Receive presentation regarding the condition of the Mokelumne River bank erosion and its potential effect on Pigs Lake.

**BACKGROUND INFORMATION:** On February 6, 2008, staff provided information to Council related to the status of the Mokelumne River bank in the general vicinity of Pigs Lake within the Lodi Lake Nature Area. Civil Engineering firm of Kjeldsen, Sinnock & Nuedeck was contracted to provide, as best possible, a detailed report on the effects of erosion of the river bank in the vicinity of Pigs Lake.

On August 13, 2008, staff received Mr. Sinnock's Preliminary Report that outlines the initial findings and recommendations regarding the erosion that is occurring on the south bank of the Mokelumne River adjacent to Pig Lake in the Lodi Lake Nature Area.

**FISCAL IMPACT** The fiscal impacts are varied and complex. Temporary measures range in cost from \$10,000 to \$25,000, excluding permits and monitoring, which are an additional \$25,000. Permanent repair costs may be greater than \$2 million. If the embankment fails, this passive recreation area may be lost permanently as the cost of permitting and reclamation will be significantly higher.

**FUNDING AVAILABLE:** None

James M. Rodems  
Interim Parks and Recreation Director

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APPROVED:

Blair King, City Manager

# KJELDSSEN, SINNOCK & NEUDECK, INC.

CIVIL ENGINEERS AND LAND SURVEYORS

STEPHEN K. SINNOCK  
CHRISTOPHER H. NEUDECK

KENNETH L. KJELDSSEN  
RETIRED

711 NORTH PERSHING AVENUE  
POST OFFICE BOX 844  
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2088-0010

August 13, 2008

Mr. Steve Dutra  
Parks & Recreation Department  
City of Lodi  
125 N. Stockton Street  
Lodi, CA 95240

Re: Lodi Lake Nature Area Erosion Along Mokelumne River, Preliminary Report

Dear Mr. Dutra,

Kjeldsen, Sinnock & Neudeck, Inc. submits herewith our Preliminary Report that outlines the initial findings and recommendations regarding the erosion that is occurring on the south bank of the Mokelumne River, adjacent to "Pig Lake" in the Lodi Lake Nature Area. This letter report has been prepared pursuant to the scope of work described in our proposal to the City of Lodi dated October 17, 2007. The purpose of this letter report is to communicate to the City of Lodi our preliminary findings and recommendations relative to 1) the probable causes of the erosion, 2) permitting requirements for construction of repairs, 3) options to repair erosion sites, 4) preliminary quantity estimates for repair options, and 5) preliminary cost estimates for repair options.

I have included as attachments to this letter report, the following exhibits:

- Exhibit A - Aerial Map and River Bank Cross-Sections
- Exhibit B - Photographs of Active Erosion Sites
- Exhibit C - Annotated Photographs
- Exhibit D - Typical Repair Section

## Probable Cause Of Erosion

There are several conditions occurring in this segment of the Mokelumne River that may be contributing to the aggressive erosion of this particular section of riverbank. Based upon our site inspections and preliminary evaluation of site conditions, there appear to be three mechanisms contributing to the active erosion of the riverbank, 1) hydraulic erosion on the lower slope, 2) wave erosion on the upper slope, and 3) bank instability due to the annual draining of Lodi Lake.

First, there is hydraulic erosion occurring below the waterline that has undermined and washed out a previous repair project that was completed in 1994. The erosion area that is the subject of this report is located on the outside bend in the river, where the flow velocities will be



the greatest. The 1994 repairs consisted of stacking a grid of tree roots and logs along the eroded bank and cabling them to existing live trees along the riverbank. The remnants of the trees and logs installed during the 1994 repair project are scattered throughout the river bottom and the lower slopes of the bank as shown in the attached photos in Exhibit B. The remnant trees and logs may be aggravating the hydraulic erosive action of the river in this area, as they could be creating eddies and turbulence that are contributing to the erosion of the lower portions of the riverbank.

Second, there appears to be wave wash erosion occurring higher up on the slope of the riverbank, at the summer water level when Lodi Lake is full. The waves are generated by both boats and wind. This erosion is clearly defined and localized at the top of the waterside slope, and is causing severe undercutting of the embankment crown. The wave wash was observed during the August inspection when watercraft passed the site.

Third, the erosion of the riverbank may be aggravated by the annual draining of Lodi Lake. The rapid drawdown of the lake in the fall could be contributing to the "erosion" of the riverbank slope by not allowing adequate time for the saturated riverbank to drain. When soils experience a rapid drawdown, the moisture that was trapped in the soils at the higher water levels are not provided adequate time to drain. This trapped moisture destabilizes the soils and on steep slopes can result in the sloughing of the cohesionless sands on the upper portions of the riverbank.

#### Permitting Issues Related To Repairs

The permitting requirements will be primarily driven by the type of repairs made, and the impacts that the project might have on the environment. As with all such projects, the repair project will have to comply with the requirements of the California Environmental Quality Act (CEQA). An initial study will need to be performed to address all of the impacts associated with the project. That process will require a qualified Biologist to inventory the species present and determine how the proposed project might impact those species. Once the impacts are determined, the project scope might be modified to avoid or minimize impacts to the environment. The results of these investigations and modifications to the project will result in the CEQA determination and provide the basis for the permit applications to the regulatory agencies listed below.

State Department of Fish & Game  
U.S. Army Corps of Engineers  
NOAA Marine Fisheries  
US Fish & Wildlife Service  
Central Valley Regional Water Quality Control Board  
State Reclamation Board  
Other Local, State **and** Federal agencies as necessary

Our office had various discussions with the regulatory agencies and biological consultants that are familiar with current regulatory and environmental issues in the area of the

project. It was made very clear in the conversations that due to the backlog of permit applications, the State and Federal agencies will not perform a site inspection to provide a preliminary assessment of impacts until a permit application is submitted by the project proponent. The project is in a biologically sensitive area where threatened and endangered species are likely to be present, and will require careful consultation and consideration during the development of the scope of work for this project. It should be noted that the permit application process requires substantial detail in order to be processed so it actually occurs after the project design and environmental issues are addressed. Estimating the costs associated with securing environmental documents and permits were not included in our scope of work.

### Erosion Repair Options

This location presents several challenges in terms of implementing a repair project. The primary obstacles are that access to the repair site is very restrictive and that the top of the riverbank adjacent to the eroded area is extremely narrow and will likely not support large construction equipment. Access to the work locations is by way of narrow foot paths through the Nature Area. The repair options presented below could be performed by either waterborne or land based equipment, however the costs for both will be higher due to the access limitations.

#### Emergency Protective Measures

Due to the length of time that may be necessary to secure permit approvals for a major project, it would be prudent for the City to investigate the possibility of placing plastic sheeting or riprap on the upper slope of the riverbank, to stabilize and protect it against further erosion during the months when Lodi Lake is full. The City should consult with the Department of Fish and Game and the Federal regulatory agencies to determine if the placement of riprap on the upper slope could be performed under an emergency notification. Another temporary option would be to limit boat speeds and wakes in that area.

#### Repair the Entire 500 Foot Eroding Bank

Placing clean quarry stone riprap along the entire reach of eroded levee would be considered the conventional repair for this location. Exhibit D illustrates a possible scenario for a repair cross section at the narrowest point between Pig Lake and the Mokelumne River. The embankment crown has been widened to 30 feet to allow for an area where plantings of various types of native vegetation could occur, as is usually required by the permitting agencies to mitigate project impacts.

Another option for repairing the eroding bank could include driving sheet piles to form a bulkhead along the eroded area, and then backfilling the upper section as necessary. Various configurations could be used to make this type of repair more user and environment friendly.

#### Flow Diversion Structure

This site might lend itself to the installation of a water diversion flow structure that would divert the high velocity flows away from the banks and force it down the center of the river. This option would require that the hydrology of the project be studied in detail in order to determine the feasibility and impacts associated with that type of concept. Possible advantages of this concept is that it might be less invasive environmentally and could require less material to construct. Potential disadvantages are the cost of the analysis and the possibility that the eroding bank might require rebuilding and armoring in addition to installation of flow diversion structures.

#### Preliminary Quantity & Cost Estimates For Repair Options

KSN performed field surveys of the site to determine the typical dimensions of the project. A copy of an aerial photograph of the project site showing the location of the 13 surveyed cross-sections of the eroded bank is attached to this report as Exhibit A. Photographs showing the existing condition of the riverbank taken at the cross-section locations is attached as Exhibits B).

The cost for riprap is based on unit prices developed from discussions and site inspections by an experienced local contractor. The unit price for riprap "in place" is estimated to be approximately \$75 per ton. Obviously, market conditions could change that estimate due to material demand, fuel prices, and changes in site conditions. Please note that these construction costs do not include the costs to secure the necessary environmental documents and permits.

#### Temporary Emergency Protective Measures

Several options exist to temporarily slow the erosion on the upper bank caused by wind and wave action when the lake is full. These measures could be implemented either by a contractor or City of Lodi staff, and would only be temporary in nature. It should be noted that placement or work on the channel bank could require that a Notification of Streambed Alteration permit be filed with the Department of Fish & Game.

The first option would be to implement speed limits on boats in the damaged section of the river. This would be a relatively inexpensive option and would require notifications, buoys and possibly the costs of enforcement. We have limited experience with the costs associated with these actions, but assume that the City of Lodi is already enforcing speed limits in other areas of the lake so additional costs would be nominal.

The second option would be to place plastic sheeting or geotextile fabric, and sandbags over the upper bank. This is a cost effective and easily installed measure. Plastic sheeting costs range from approximately \$60 - \$100 for 100x 20 foot rolls. Estimated need is 500 feet so materials are estimated at about \$500. These materials could be installed by City of Lodi employees. The installed cost of this temporary option is estimated at \$10,000.

The third, and most expensive option, would be to hand place riprap in the eroded areas at the "lake full" waterline. This option does have drawbacks due to access issues, high labor costs and the potential for site preparation work. Due to the soil types at the eroded sites, there is potential for the rock to slip down the slope. Estimated costs are based on using \$75 per ton unit price for rock, and filling a band approximately 3 feet high and 500 feet long to a depth of 18 inches, or 660 lbs per foot. Estimated cost for this item is \$25,000.

#### Permanent Repairs

As stated above, permanent repair options include placement of riprap on the entire eroded area, driving sheet piles or developing a hydraulic flow diversion structure in the channel. We are providing costs for armoring and sheet pile options. The flow diversion structure would require hiring a hydraulic consultant to determine the feasibility of such an option.


Based on our survey data, the preliminary estimates indicate that 15,500 tons of material will be required to construct the structure illustrated in the attached Repair Exhibit (Exhibit D). The material would consist of a combination of rock fill and riprap. The total cost, based on \$75 per ton "in place" would be \$1,116,000.

Driving sheet piling along the eroded stretch is another option. Recent project costs, where there was good access, have been running about \$40 per square foot, installed. Due to the access issues, and that the pile driving equipment might need to be marine based, we have doubled the square foot costs for installed sheet piles. Using 40 foot sheets for the entire reach of eroded area result in an area of 20,000 square feet. At a unit cost of \$80 per square foot, the total estimate is \$1,600,000.

Please note that these estimates are preliminary and are intended to give the City an idea as to the magnitude of the costs associated with each repair option. The costs seem very high for the relatively simple work that is being performed, but with escalating costs for materials and the potential for double and triple handling of the materials, we feel they are a conservative estimate given the limited information that is available on the project at this time.

If you should have any questions or require further information, please contact Bill Darsie or me at (209) 946-0268.

Sincerely,  
KJELDSSEN, SINNOCK & NEUDECK, INC.

  
\_\_\_\_\_  
/Stephen K. Sinnock

w/enclosures

# EXHIBIT B







Station 1+50

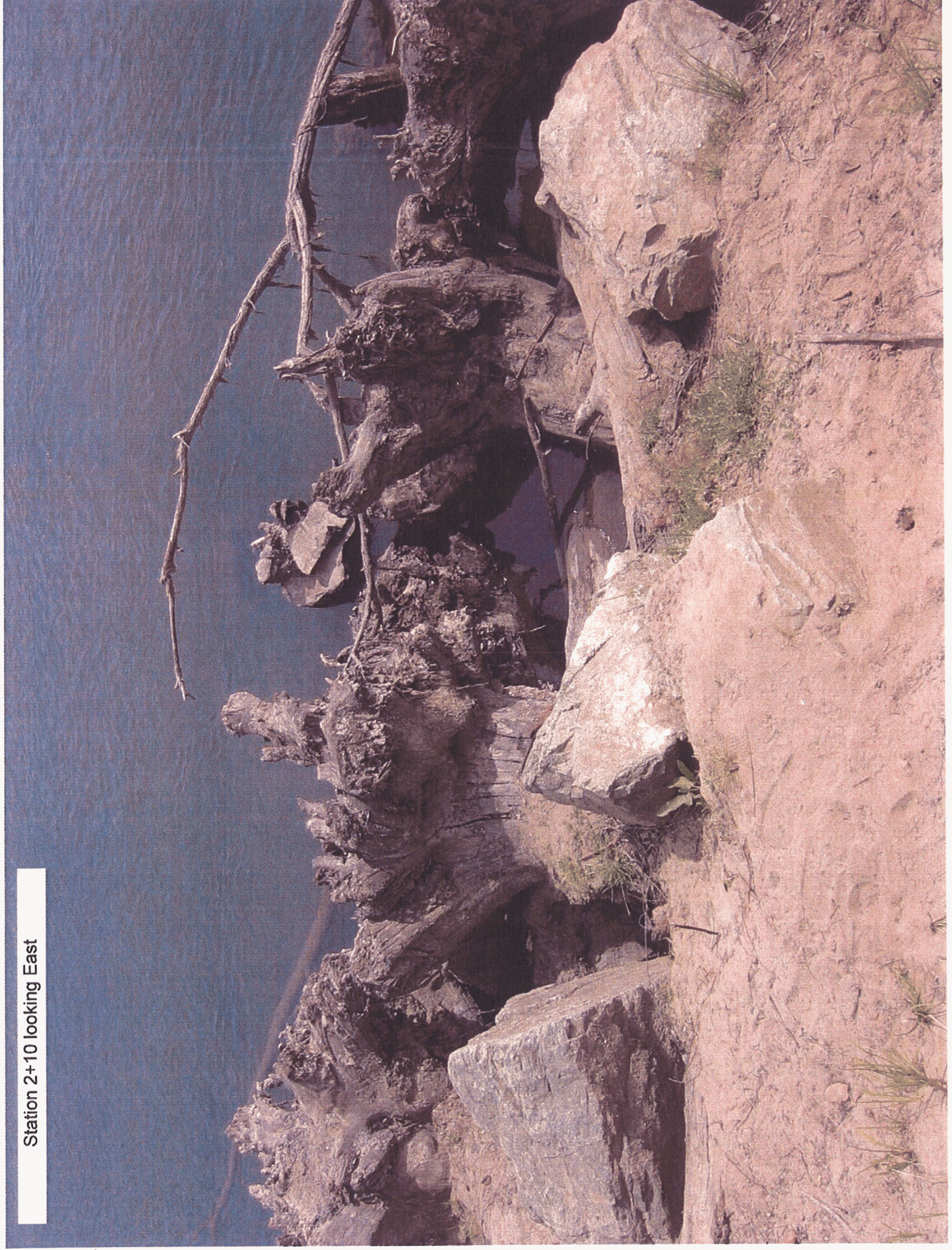






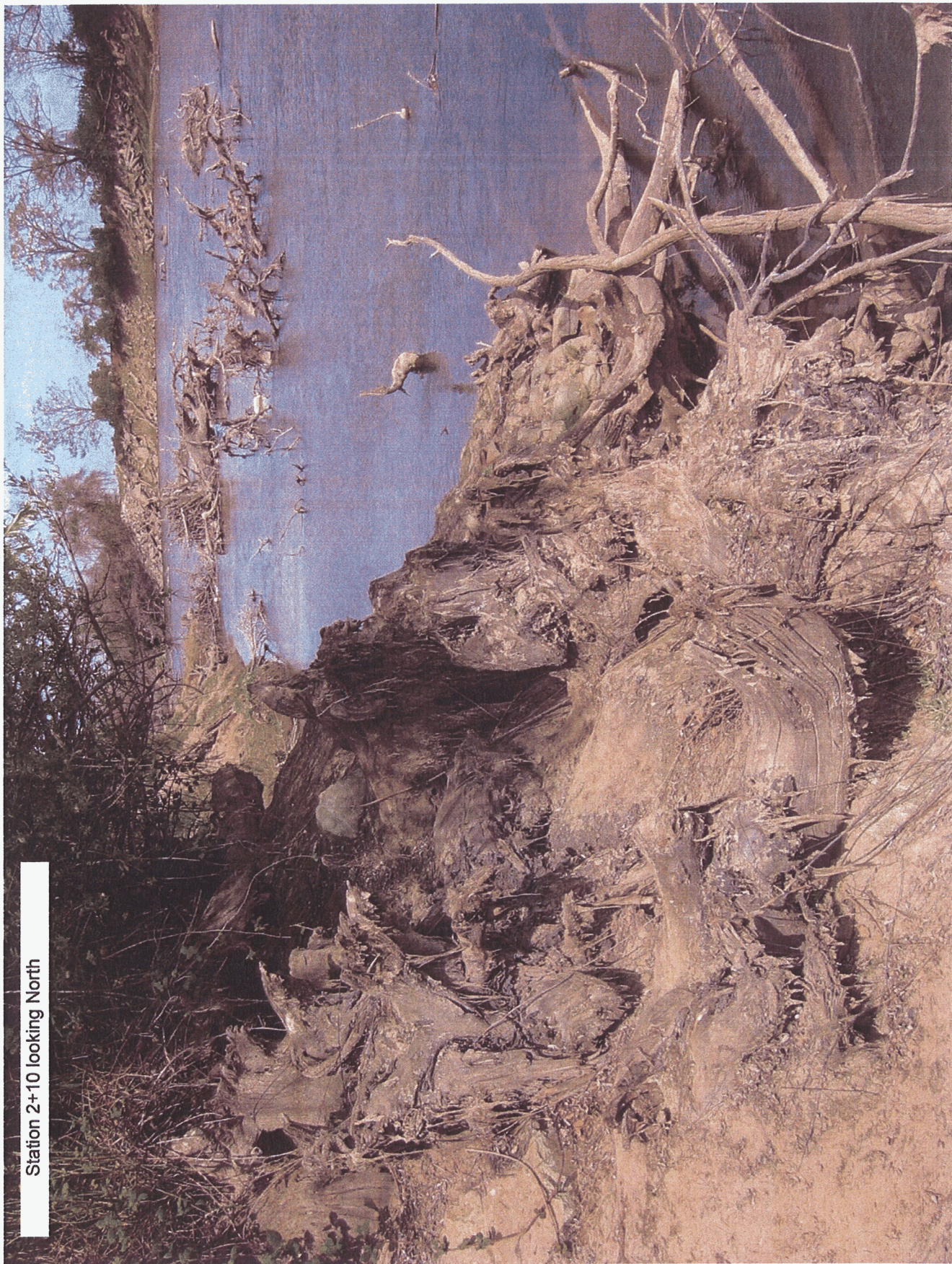


Station 2+10 looking East



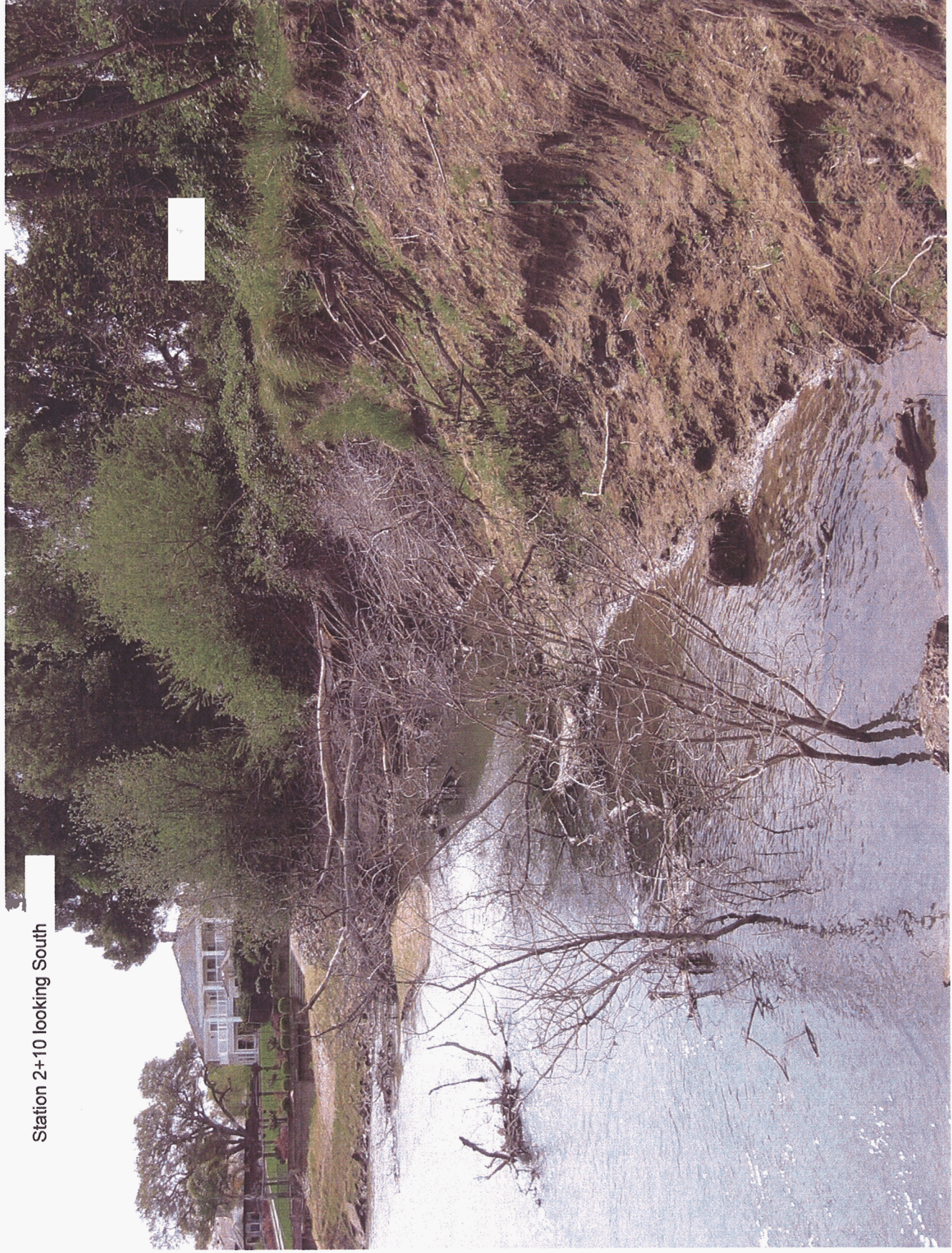


Station 2+10 looking North





Station 2+10 looking South



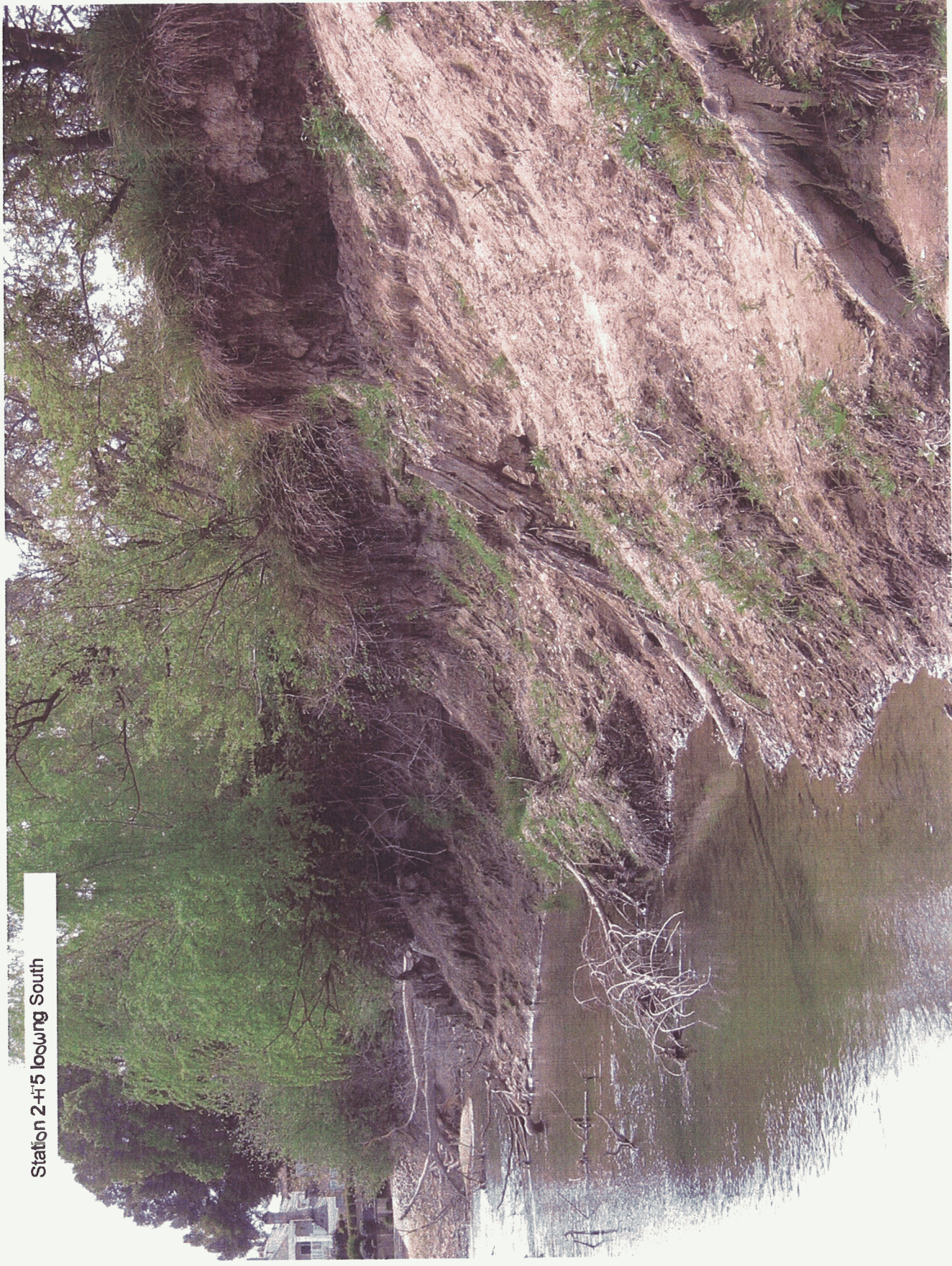


Station 2+40 looking North





Station 2+15 looking South



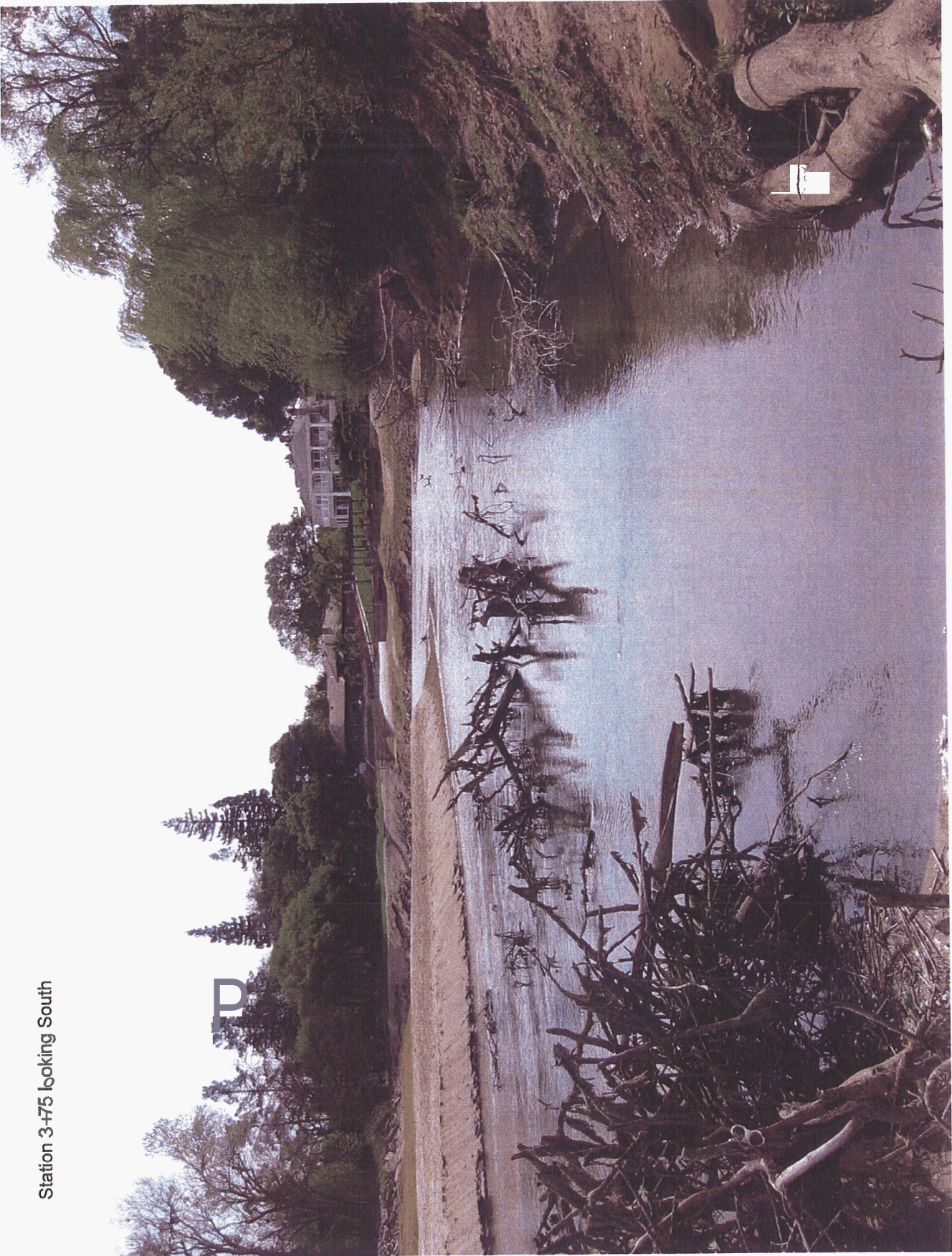


Station 3+30 looking Southwest





Station 3+75 looking South





Station 3+90 looking South



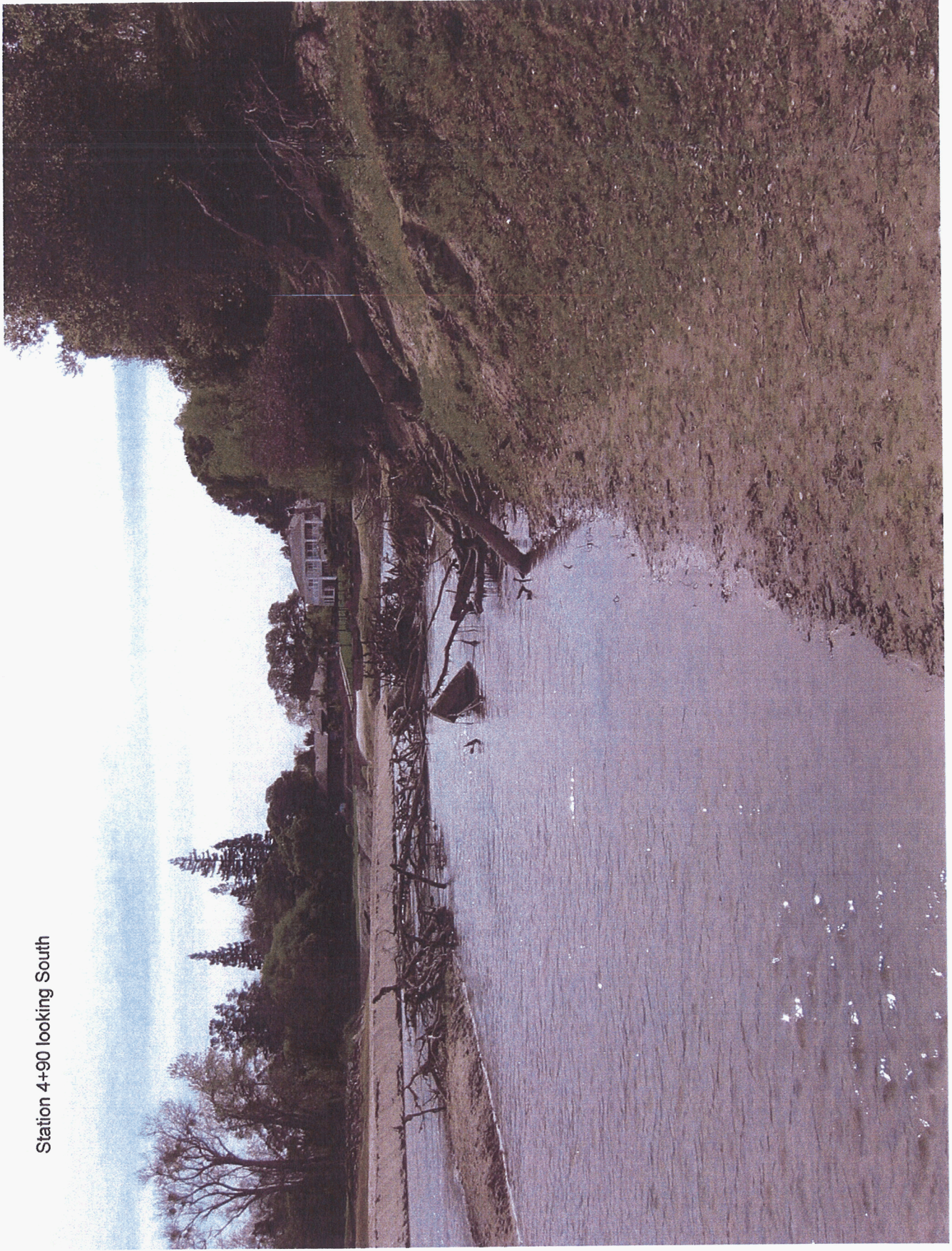


Station 4+50 looking South





Station 4+90 looking South





Station 5+40 looking South



# EXHIBIT C







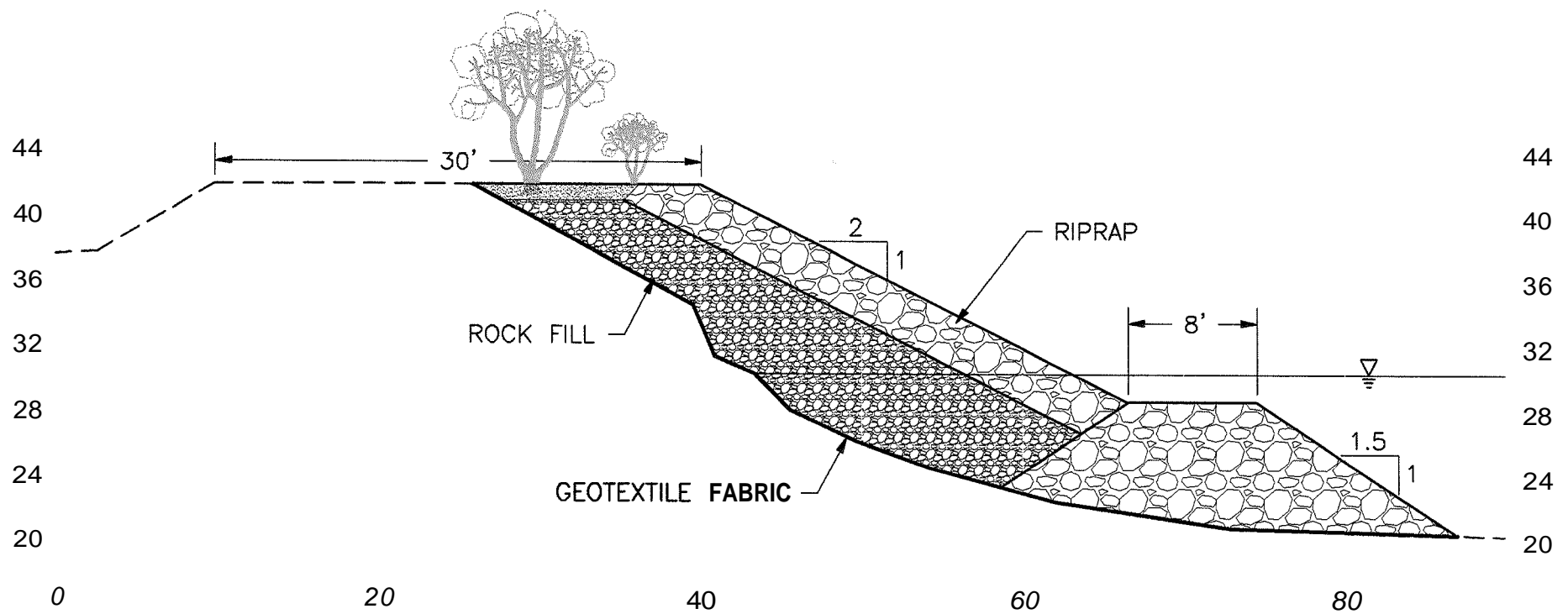






# EXHIBIT D





TYPICAL REPAIR SECTION

**K S N** KJELDSSEN  
SINNOCK  
NEUDECK  
INC. Consulting Engineers  
and Land Surveyors

Post Office Box 844  
711 N. Pershing Avenue  
Stockton, CA 95201-0844  
Office: (209) 946-0268  
Faxes: (209) 946-0296  
E-mail: KSN@ksninc.com

LODI LAKE/MOKELUMNE RIVER  
LODI, CALIFORNIA

LEVEE BANK EROSION CONTROL  
REPAIR EXHIBIT

Design  
WGD

Drawn  
JAM

Check  
SKS

Scale

1" = 10'

Original Drawing Scale

0 1/4" 1/2"

Date

MAY 2008

Sheet Number

1 Of 1

Project File No.  
2088-0010



## CITY OF LODI COUNCIL COMMUNICATION

**AGENDA TITLE:** Resolutions Approving the Applications for California River Parkway and Urban Streams Restoration Grant Funds

**MEETING DATE:** November 5, 2008

**PREPARED BY:** City Manager's Office

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**RECOMMENDED ACTION:** Adopt two Resolutions approving the application for grant funds from the California River Parkway Grant program and the Urban Streams Restoration Grant program under Proposition **84**, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006.

**BACKGROUND INFORMATION:** A 500-foot stretch of Mokelumne River riverbank is rapidly eroding, threatening to flood the Lodi Lake Park Nature Area. Because of the difficulty in bringing heavy equipment and materials to the site, repairs will be costly. Construction costs alone for the most-expensive option were estimated recently at as much as \$1.6 million, plus permitting fees and other costs associated with managing the project.

The City is seeking grant funds available under Proposition **84** to pay for the repairs. The grant applications require the City Council approve the attached Resolutions to show the City's commitment to completing the Lodi Lake Park Nature Area Protection Project if it is funded with State bond proceeds.

The State's California River Parkway Grant Program has \$30.9 million available this year for projects that accomplish at least two of the following goals: Provide recreational opportunities, protect or improve riparian habitat, maintain or restore open space as part of a flood management plan, convert riverfront land to river parkways, and provide facilities to support conservation activities. Grants under this program are not capped and, as a local public agency, the City is permitted to be the sole applicant. The City will seek the entire project amount through this program.

The Urban Streams Restoration Grant Program has \$9.1 million available, with a \$1 million maximum request. Projects must provide flood management or erosion control benefits, restore or enhance riparian ecosystems and promote local stewardship. The Urban Streams Restoration grants require two applicants. The Lower Mokelumne River Watershed Stewardship Steering Committee has agreed to cosponsor the City's application under this program. Because the River Parkway and Urban Streams Restoration grant programs allow overlapping requests, the City is seeking the maximum \$1 million grant through the Urban Streams Restoration program.

The City is requesting approximately \$1.6 million to repair a 500-foot section, resulting in a new section of handicapped-accessible riverbank trail that would also provide locations for interpretive panels describing erosion along rivers. According to an engineer who recently studied the site, the riverbank is destined to fail in a matter of years. If that happens, the Nature Area will be subjected to regular flooding, destroying rare riparian habitat in an urban environment.

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APPROVED:

A handwritten signature in black ink, appearing to read "Blair King", written over a horizontal line.

Blair King, City Manager

In addition to the attached Resolutions, the City's application will be accompanied by letters of support from elected officials and members of groups who see the value the Nature Area provides to the region.

**FISCAL IMPACT:** Although applying for the grants does not ensure funding, a lack of outside funding puts the financial burden of paying for long-term repairs on the City. If the City's grant application is successful, the City could receive approximately \$1.6 million for riverbank repairs, permitting, project management and other associated costs. Up to \$1 million is available through the Urban Streams Restoration Grant Program and the entire **\$1.6** million is available through the River Parkways Grant Program. These grant awards could overlap.

**FUNDING AVAILABLE:** N/A

  
\_\_\_\_\_  
Jeff Hood  
Communications Specialist

**Attachments:** Resolutions

RESOLUTION NO. 2008-214

A RESOLUTION OF THE LODI CITY COUNCIL  
APPROVING THE APPLICATION FOR GRANT FUNDS FOR  
THE CALIFORNIA RIVER PARKWAYS GRANT PROGRAM  
UNDER THE SAFE DRINKING WATER, WATER QUALITY AND  
SUPPLY, FLOOD CONTROL, RIVER AND COASTAL  
PROTECTION BOND ACT OF 2006 (PROPOSITION 84)

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WHEREAS, the Legislature and the Governor of the State of California have provided funds for the program shown above; and

WHEREAS, the Resources Agency has been delegated the responsibility for the administration of grant programs, establishing necessary procedures; and

WHEREAS, said procedures established by the State Resources Agency require a resolution certifying the approval of application by the Applicant's governing board before submission of said application to the State; and

WHEREAS, the Applicant, if selected, will enter into an agreement with the State of California to carry out the project

NOW, THEREFORE, BE IT RESOLVED that the Lodi City Council:

1. Approves the filing of an application for the Lodi Lake Nature Area Protection Project;
2. Certifies that Applicant understands the assurances and certification in the application;
3. Certifies that Applicant or title holder will have sufficient funds to operate and maintain the project consistent with the land tenure requirements; or will secure the resources to do so;
4. Certifies that it will comply with all provisions of Section 1771.5 of the California Labor Code;
5. Certifies that the project will comply with any laws and regulations including, but not limited to, the **California Environmental Quality Act**, legal requirements for building codes, health and safety codes, disabled access laws, and, that prior to commencement of construction, all applicable permits will have been obtained; and
6. Appoints the City Manager, or his designee, as agent to conduct all negotiations, execute and submit all documents including, but not limited to, applications, agreements, payment requests, and so on, which may be necessary for the completion of the aforementioned project.

Dated: November 5, 2008

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I hereby certify that Resolution No. 2008-214 was passed and adopted by the City Council of the City of Lodi in a regular meeting held November 5, 2008, by the following vote:

AYES: COUNCIL MEMBERS – Hitchcock, Hansen, Johnson, Katzakian,  
and Mayor Mounce

NOES: COUNCIL MEMBERS – None

ABSENT: COUNCIL MEMBERS – None

ABSTAIN: COUNCIL MEMBERS – None

A handwritten signature in black ink, appearing to read 'R. Johl', with a long horizontal line extending to the right.

RANDI JOHL  
City Clerk

RESOLUTION NO. 2008-215

A RESOLUTION OF THE LODI CITY COUNCIL ENDORSING  
THE APPLICATION FOR GRANT FUNDS FOR THE CALIFORNIA  
URBAN STREAMS RESTORATION GRANT AND DETERMINING  
APPROPRIATE ENVIRONMENTAL DOCUMENT, CONDITIONALLY  
ACCEPTING GRANT IF OFFERED, AND DESIGNATING CONTRACT  
MANAGER AND FISCAL AGENT

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WHEREAS, the California Department of Water Resources, Division of Planning and Local Assistance, Urban Streams Restoration Program has announced the availability of funds for grants; and

WHEREAS, said grants are intended to help solve flooding and erosion problems in a way that provides environmental enhancement; and

WHEREAS, the Lodi Lake Park Nature Area is in danger of flooding from erosion along the Mokelumne River riverbank; and

WHEREAS, the Lower Mokelumne River Watershed Stewardship Steering Committee has proposed to co-sponsor a grant application with the City of Lodi; and

WHEREAS, we have concluded the project proposed for funding with the grant funds would be environmentally beneficial and categorically exempt from requirements of the California Environmental Quality Act (CEQA) under one or more of the following exemptions per sections 15300-15329 of the CEQA Guidelines: Section 15301(c); and

WHEREAS, we consider the prospects of receiving a grant to be reasonably likely.

NOW, THEREFORE, BE IT RESOLVED that the Lodi City Council does hereby approve the joint application with the Lower Mokelumne River Watershed Stewardship Steering Committee for an Urban Streams Restoration Program grant.

If offered such a grant, the City Manager is hereby authorized to accept and sign any contract for administration of the grant funds, and the Public Works Director is authorized to act as Project Manager for the project. Authority is delegated to the Project Manager to manage the Agreement and to delegate authority to others to provide management and support services required for performance of the work and administration of the Agreement. The delegation of authority to submit invoices requires written consent by both grantees, which will be provided to the Department of Water Resources.

Dated: November 5, 2008  
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I hereby certify that Resolution No. 2008-215 was passed and adopted by the City Council of the City of Lodi in a regular meeting held November 5, 2008, by the following vote:

AYES: COUNCIL MEMBERS – Hitchcock, Hansen, Johnson, Katzakian,  
and Mayor Mounce

NOES: COUNCIL MEMBERS – None

ABSENT: COUNCIL MEMBERS – None

ABSTAIN: COUNCIL MEMBERS – None



RANDI JOHL  
City Clerk

The background image is a photograph of a river scene. In the foreground, there are tall, green grasses. The river is in the middle ground, and the background is filled with a dense line of trees, some with green leaves and others with autumn-colored foliage. The sky is a clear, pale blue.

# Mokelumne River Erosion Near Pigs Lake

**Presented by James Rodems  
Interim Parks & Recreation Director**

**Nov 5, 2008**





# Pigs Lake riverbank project

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- ❑ Site inspection was completed including site survey and schematic site map
- ❑ Secured final engineer's report
- ❑ Engineer contacting State and Federal agencies regarding preliminary repair work
- ❑ Investigate funding



# Pigs Lake Report Highlights

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- ❑ 500 feet of eroding bank that separates Pigs Lake/Nature Area from Mokelumne River.
- ❑ Failure of the bank would cause flooding resulting in a loss of the Nature Area.
- ❑ Report proposes temporary measures costing \$10,000 to \$25,000 excluding permits.
- ❑ Permanent repairs estimated at \$1.6 million to in excess of \$2 million, including permits.



# Possible Fund Sources

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- Apply for leftover grant funds from the Lodi Lake Boat House project.
- Additional State Grants.
- Potential use of Park Impact fees.